extension of the manner of roofing the earlier circular churches. They built a square and clapped a dome on the top, and so on and so on, until the required length of nave was attained. But with the Gothic the tunnel or barrel vault was the simple means employed of roofing the nave. Where side aisles existed, a semi-vault was thrown over them to help in resisting the thrust of the main vault. This relieved the walls of considerable weight, and having found that it was possible in this way to support the vaults and piers, they made their aisles of two stories, putting windows in the outer walls to give light to the upper part of the nave. But still there was no light in the vault or roof.

Now in Normandy, a more northern province, and still more so in England, more light was essential; and simple as it seems, this was the actual cause of the development of the pointed Gothic. You have only to go to the north of France to see this for yourself. Church after church was erected, and the steps in the problem are to be seen in almost all, and we must follow these steps, to see how the pointed arch served the turn of the Mediæval architects. But to make myself clear is by no means an easy matter. There is nothing more intricate in all our science than vaulting, and I doubt if it is possible in five or ten minutes to enable those among you who know very little at present on this subject to comprehend it through what I say. I can only give you an outline now—details must be filled in later.

Well, then, the first thing that we find them doing in order to obtain more light, is to alter the form of the vault. Hitherto it has only been the barrel or the pointed arch in section, and the first idea that appears to have occurred to them, was the absolute necessity of raising the side walls above the springers of the vault. This was accomplished by the introduction of bold diagonal ribs or groins stretching across the nave from south-west to north-east and north-west to south-east, and making the walls very thick at the corners of the square of vaulting, and building piers in fact strong enough to resist the thrust of the groins. Thus the vaulting divided the nave into squares, and as the aisles were narrower than the nave, the square of the aisle roofs was smaller than the square of the nave; so that an intermediate pier in the nave that had really nothing to do with the vaulting of the nave, but formed a corner of the aisle vaulting, had to be put in; and in order to give it a semblance of use in the nave, they carried it up and threw a small arch across the nave which gave some support to the top of the groining which did not require it at all.

This was so evident a makeshift, and so contrary to the spirit of true art which does not admit of shams, that they found it was of no use attempting anything further with the round arch, and not withstanding all the ingenuity expended upon the subject in France, Germany and England, their attempts to make the round arch serve the purpose proved futile. The consequence of this proved momentous. They saw that they must adopt the pointed arch and having once made the attempt, they found their way out of the difficulty. By using the pointed arch for the finish of the nave walls, they could not only attain any height they required, but it was no longer necessary to make the plan of each section of vaulting a square; but instead, the intermediate pier became a main one, giving its support not only to the vaults of the aisles, but also to the nave vaults. Then, if they made the section of the vault a pointed arch too, there was no limit to the possibilities of construction. The diagonal ribs of these lofty vaults gave, however, a tremendous thrust to be resisted, and enormous buttresses were built to counteract it. There was only one other step to be taken; if they made the pointed arch of the side walls spring from pier to pier, as a discharging arch, they could do what they liked with the wall itself. With no weight to support, they could pierce its whole width from pier to pier with windows or other openings, for it had become simply a screen to protect the interior of the edifice. It had become what Mr. Ruskin calls "a veil," serving no further purpose than a veil or curtain.

The pointed arch once introduced, was quickly substituted for the rounded heads of windows and doors, and airiness and lightness henceforth characterized every detail.

One other great constructional or structural feature we must notice before proceeding with the problem of vaulting. The immense buttresses, so massive and heavy, occupied a great deal of space, and it was required to reduce them to a minimum. Have you ever thought what could be the relation of the pinnacle to the buttress? Probably you have thought it was more an ornament than a want. If you open your penknives and stick the point of one blade in the table and then press against the upper end of the handle horizontally, it will very soon tumble over; but if you put a weight on top of the handle, it will not be so easy to knock down the knife. So it was with the buttresses. The pinnacle acts as a heavy weight pressing down upon the top of the buttress, and in proportion to its weight the size of the buttress could be reduced. This was a very neat problem, to determine the weight and size of the pinnacle as compared with the size of the buttress necessary to resist the thrusts of the vaults. This is Early English art, the most perfect of the English periods.

Upon all this followed a gradual transformation of every feature. The new groups of three lancets enclosed beneath a label mould, left solid spandrils that were only reduced, not done away with, when five lancets were placed side by side. It was a simple matter to pierce this spandril with a trefoil or something of the sort, but why have it there at all when there was a relieving arch above it which carried all the super-imposed weight? These piers between the lights were reduced, until, in the Decorated Period, they became shafts with caps and bases instead of piers.

I do not propose to enter just now into a description of the details of the three periods under consideration. You all know something about them, and time will not admit, for we have not yet done with the principal feature, the vaulting.

The freedom of the Early English moldings as compared with the geometrically true moldings of the Decorated, and the shallowness of the Perpendicular we can discuss presently; as also we can speak about the introduction of new details. But I want you to bear this in mind, and it is a point not half enough noticed, that the perfection of the art of architecture was attained by the Early English period, and that subsequent periods are retrogressive instead of progressive as far as art was concerned. In the Decorated period many features and details were enriched amazingly, but it was without that freedom which characterizes Early English. They turned the trefoil of the Early English with a quatrefoil, which in time became the cinquefoil of the Perpendicular, and by these features alone one can tell the date of any church in Christendom. As the Decorated took away the piers from between the lancets of the Early English, the Perpendicular changed the pillars of the Decorated into vertical mouldings.

Having reached perfection of utility in vaulting, the restless spirits tried to improve upon perfection, and in doing so, naturally went from bad to worse, until after the expenditure of the most consummate ingenuity, they had to confess they had gone back to the original starting point, when to introduce the pointed arch again was their only salvation. They desired to lighten the heavy inverted pyramids of the simple form of Early English vaulting, (as shown on the diagram). They cut off the corners and made semi-octagons of them. Each side of this figure was again sub-divided, until it was so nearly a circle that it was impossible to resist the temptation of making it one. These circles, as you can see, left large flat spaces at the crown of the vault that required support, and were not satisfactory to decorate, but by a continuation of one of the rays of the circle, a diagonal rib was obtained, which gave this flat surface a camber. But where the height of this camber, owing to the pitch or rise of the diagonal rib, would have been very great, they adopted—or attempted rather, for it did not become a fixed principle—that ingenious feature, the pendant, literally hanging from the ribs, the backs of which pressed together gave it support. It was a structural makeshift, and therefore a failure architecturally.

Hitherto their lines had all been true parts of circles, every line a single curve from springer to crown, but here in order to make this fan vaulting successful, they introduced that abomination, the four centred arch. So low had they sunk in their struggles with construction, that they had lost all feeling of art. Every feature was now dealt with from a purely constructional point of view, and art was almost dead. It came about in this way. They had got back to the former principle of vaulting the naves in squares. From each pier sprang a fan vault, the main or transverse rib became broken-backed, and the section thus produced was the four centred arch.

Very many architects of the present day find this wretched makeshift a very convenient feature in their construction—convenient, but not artistic. There is an excuse now-a-days for its use in the economy of house planning. But let me urge upon you to do without it whe ever it is possible. Never introduce it as a feature in any of your designs, or you are trying to make of an acknowledged abortion, a thing to be admired. But no one ever succeeded yet in the attempt. You may as well try to make a silk purse out of a sow's ear. You can make a useful article out of it, but not a silk purse.

Now I must bring this rapid sketch to a conclusion, and no doubt your President will open the discussion.

CONTRACTS

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PEMBROKE, ONT.—An addition is to be built to the public school.

CRANBROOK, ONT.—The Foresters' Court contemplate building a new hall.

SPRINGHILL, N. S.—A new school house to cost $5,500 will probably be erected here.

ESSEX, ONT.—Messrs. Williams Bros. will rebuild the Gardner Block, which was recently burned.

SMITH'S FALLS, ONT.—Mr. Alexander Wood contemplates the erection of a four storey oatmeal mill.

COMBERMERE, ONT.—$900 has been granted by the Ontario Government to complete the repairs to the bridge here.

OTTAWA, ONT.—The present season's expenditure in building operations will amount to about half a million dollars.

BARRIE, ONT.—It is said that the Methodists and English Church people of Trout Creek, are preparing to build new churches.

WOODSTOCK, ONT.—The Mayor has called a public meeting for the 22nd, to discuss plans for the maintenance of a public hospital.

ORILLIA, ONT.—Mr. J. M. Moore, of London, Ont., has been engaged to report on the enlargement of the water works system.

WATERLOO, ONT.—The Methodists will erect a church at an estimated cost of $7,800.—A Roman Catholic church to cost about $3,000 will also be built.

MOOSOMIN, N. W. T.—Mr. C. H. Wheeler, of Winnipeg, is preparing plans for a large brick and stone hotel to be built here for Mr. Whymsing. The building will cost about $8,000.

NEW GLASGOW, N. S.—$50,000 has been appropriated for increasing the capacity of the water system, constructing a system of sewerage, and improving the streets.

LONDON, ONT.—Rev. Mr. McLaurin will erect a handsome residence at the corner of Cromwell and Vidal streets.—By-laws authorizing the block paving of several streets have passed.

WINNIPEG, MAN.—It is said to be the intention of the Great Northwest Railway to extend its lines at least 100 miles during this summer. The work will be commenced some time in June.

KINGSTON, ONT.—The plans prepared by Mr. Newland, architect, for a central fire station, have been accepted.—The School Board will ask the Council to grant $20,000 for the erection of a new school building.—Mr. Dickinson has purchased a site for three dwellings on Sydenham street.

MONTREAL, QUE.—The location of the proposed new buildings on the McGill University grounds have been decided upon. It is said that work will be entered upon immediately, and the whole completed before the end of the year.—Tenders will be shortly asked for plumbing and heating the new Victoria hospital.

HAMILTON, ONT.—A site for a north end branch of the Bank of Hamilton has been purchased at the corner of James and Barton streets.—Plans have been prepared and tenders will be immediately asked for remodelling the Central School building.—The Finance Committee of the Council recommend the issuing of debentures to the amount of $50,000 for school building purposes.

TORONTO, ONT.—Plans are being prepared for a new factory to be erected for Millichamp & Co., on King st. west.—Extensive alterations are to be made to the Millichamp buildings, Adelaide St. E.—The Public Library Board has instructed its architect to prepare plans for a branch library building immediately west of College St. fire station.—A sum has been added to the estimates of the Public School Board to cover the erection of a new school building in St. Matthew's Ward.—Mr. W. H. C. Kerr will erect a business block adjoining the new Canada Life Buildings on King St. west.—The following building permits have been issued: Mrs. Gates, pr. 2 storey and attic bk. stores, 227 and 229 King St. east, cost $3,500.